

REMARKS

Claims 1-17, 21, 22 and 26-44 are pending in this application. Claims 18-20 and 23-25 have been canceled without prejudice or disclaimer. Claims 1-17, 21 and 22 have been amended. Claims 26-44 have been newly added.

Claims 18-20 and 23-25 have been canceled without prejudice or disclaimer, and claims 1-17, 21 and 22 have been amended, for the sole reason of advancing prosecution. Applicants, by canceling or amending any claims herein, make no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicants reserve the right to reassert any of the claims canceled herein or the original claim scope of any claim amended herein, in a continuing application.

Claim 1 has been amended to recite “[a] process for manufacturing a particulate titanium dioxide product, comprising: providing an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l calculated as TiO₂; adding titanium dioxide particles as crystal nuclei to the aqueous solution of titanium oxychloride; precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure to obtain a precipitated hydrated titanium dioxide product; calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C to obtain a titanium dioxide product comprised of more than 70% rutile in a crystal form.” Support for claim 1, as amended, can be found throughout the specification and claims as originally filed.

Claims 2-17, 21 and 22 depend, either directly or indirectly, from claim 1. Claims 2-17, 21 and 22 have been amended to be in a form consistent with U.S. practice.

Claims 26-44 have been newly added to further define the claimed subject matter. New claims 26-44 contain subject matter deleted out of claims 2-17, 21 and 22. Support for new claims 26-44 can be found throughout the specification and claims as originally filed. For example, please see claims 2-17, 21 and 22 as originally filed.

No new matter has been added.

In view of the remarks set forth below, further and favorable consideration is respectfully requested.

I. *At page 2 of the Official Action, claim 11 has been objected to as being informal.*

The Examiner asserts that claim 11 is informal because "specific surface" should read "specific surface area" and "g/m²" should read "m²/g."

In view of the following, this rejection is respectfully traversed.

Applicants submit that claim 11 has been amended as requested by the Examiner. Therefore, the Examiner is respectfully requested to withdraw this objection.

II. *At page 2 of the Official Action, claims 2-12 have been rejected under 35 USC § 112, second paragraph, as indefinite.*

The Examiner asserts that claims 2-12 are indefinite due to the recitation various broad ranges together more narrow ranges.

In view of the following, this rejection is respectfully traversed.

Applicants submit that claims 2-12 have each been amended to recite a single range. Applicants respectfully submit that, in view of the amendments to claims 2-12, the rejection under 35 USC § 112, second paragraph, has been obviated.

Accordingly, Applicants respectfully submit that present claims 2-12 are clear and definite within the meaning of 35 USC § 112, second paragraph. Thus, the Examiner is respectfully requested to withdraw this rejection.

III. *At page 4 of the Official Action, claim 12 is rejected under 35 USC § 112, second paragraph.*

The Examiner asserts that claim 12 is incomplete for omitting essential elements, which amount to a gap between the amendments.

Applicants respectfully submit that this rejection has been obviated by the amendment to claim 12. Therefore, the Examiner is respectfully requested to withdraw this rejection.

IV. *At page 5 of the Official Action, claims 18-20, 23 and 24 have been rejected under 35 USC § 112, second paragraph.*

The Examiner asserts that claims 18-20, 23 and 24 are indefinite for reciting the use of a titanium dioxide product without setting forth any steps involved in the method/process.

Applicants respectfully submit that claims 18-20, 23 and 24 have been cancelled without prejudice or disclaimer. In view of the cancellation of claims 18-20, 23 and 24, Applicants submit that this rejection has been rendered moot. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

V. *At page 5 of the Official Action, claims 18-20, 23 and 24 have been rejected under 35 USC § 101.*

The Examiner asserts that claims 18-20, 23 and 24 are directed to non-statutory subject matter because the claims recite a use, without setting forth any steps involved in the process.

Applicants respectfully submit that claims 18-20, 23 and 24 have been cancelled without prejudice or disclaimer. In view of the cancellation of claims 18-20, 23 and 24, Applicants submit that this rejection has been rendered moot. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

V. *At page 5 of the Official Action, claims 18-20 and 23-25 have been rejected based on the doctrine of statutory type double patenting as set forth in 35 USC § 101.*

The Examiner asserts that claims 18-20 and 23-25 are directed to substantially similar subject matter.

Applicants respectfully submit that claims 18-20 and 23-25 have been cancelled without prejudice or disclaimer. In view of the cancellation of claims 18-20 and 23-25, Applicants submit that this rejection has been rendered moot. Accordingly, the Examiner is respectfully requested to withdraw this rejection.

VI. At page 8 of the Official Action, claims 1-4, 7, 9, 10, 14-17, 21 and 24 have been rejected under 35 USC § 102(b) as anticipated by, or in the alternative, under 103(a) as obvious over Jones et al. (US Patent No. 5,024,827).

The Examiner asserts that Jones et al. both anticipates and renders claims 1-4, 7, 9, 10, 14-17, 21 and 24 obvious.

In view of the remarks set forth herein, this rejection is respectfully traversed.

The test for anticipation is whether each and every element as set forth is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131. The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

To establish a *prima facie* case of obviousness, the Examiner must satisfy three requirements. First, as the U.S. Supreme Court very recently held in *KSR International Co. v. Teleflex Inc. et al.*, Slip Opinion No. 04–1350, 550 U. S. ____ (April 30, 2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. ...it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the

claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (*KSR, supra*, slip opinion at 13-15.) Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicants respectfully submit that the cited reference does not teach or suggest every element of the present claims as required for anticipation under 35 USC § 102 (b). Additionally, it is submitted that a *prima facie* case of obviousness has not been established because nothing in the applied references teach or suggest all of the elements of the present claims, as required by *In re Wilson*.

Claim 1 is directed to a process for manufacturing a particulate titanium dioxide product, comprising: providing an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l calculated as TiO₂; adding titanium dioxide particles as crystal nuclei to the aqueous solution of titanium oxychloride; precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure to obtain, a precipitated hydrated titanium dioxide product; calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C to obtain a titanium dioxide product comprised of more than 70% rutile in a crystal form. Claims 2-4, 7, 9,

10 and 14-17 depend, either directly or indirectly, from claim 1. Claims 21 and 24 have been canceled.

In contrast, Jones et al. is directed to a form of titanium dioxide developed in which the particles have a substantially rectangular cross-section with a width to length ratio of at least 0.8:1.0. See Jones et al. at the abstract.

The presently claimed subject matter is distinguishable from Jones et al. for at least the reason that the precipitation temperature and pressure are different. In this regard, Jones et al. describes a temperature in the range of from 190 to 200°C under autothermal pressure. In contrast the presently claimed subject matter recites precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure. Additionally, Jones et al. does not teach or suggest the preparation of rutile, as presently claimed. In this regard, Applicants respectfully submit that Jones et al. describes the crystal form of anatase, c.f., column 1, lines 14-18, column 4 at claim 2, citing 80% anatase form. Accordingly, Jones et al. do not teach or suggest each and every element of the presently claimed subject matter.

Therefore, Applicants submit that Jones et al. do not anticipate, or render the presently claimed subject matter obvious, within the meaning of either of 35 USC §§ 102(b) or 103(a). Accordingly, the Examiner is respectfully requested to withdraw this rejection.

VII. **At page 11 of the Official Action, claims 1, 5-7, 9-12, 14-17, and 24 have been rejected under 35 USC § 102(b) as anticipated by, or in the alternative, under 103(a) as obvious over Li et al. (of record).**

The Examiner asserts that Li et al. both anticipates and renders claims 1, 5-7, 9-12, 14-17, and 24 obvious.

In view of the remarks set forth herein, this rejection is respectfully traversed.

The test for anticipation is whether each and every element as set forth is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131. The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

To establish a *prima facie* case of obviousness, the Examiner must satisfy three requirements. First, as the U.S. Supreme Court very recently held in *KSR International Co. v. Teleflex Inc. et al.*, Slip Opinion No. 04–1350, 550 U. S. ____ (April 30, 2007), “a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. ...it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the

claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (*KSR, supra*, slip opinion at 13-15.) Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicants respectfully submit that the cited reference does not teach or suggest every element of the present claims as required for anticipation under 35 USC § 102 (b). Additionally, it is submitted that a *prima facie* case of obviousness has not been established because nothing in the applied references teach or suggest all of the elements of the present claims, as required by *In re Wilson*.

As discussed, claim 1 is directed to a process for manufacturing a particulate titanium dioxide product, comprising: providing an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l calculated as TiO₂; adding titanium dioxide particles as crystal nuclei to the aqueous solution of titanium oxychloride; precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure to obtain a precipitated hydrated titanium dioxide product; calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C to obtain a titanium dioxide product comprised of more than 70% rutile in a crystal form.

Claims 5-7, 9-12 and 14-17, depend, either directly or indirectly, from claim 1. Claim 24 has been canceled.

In contrast to the presently claimed subject matter, Li et al. does not teach or suggest the presently claimed amount of titanium dioxide in the solution. In this regard, present claim 1 recites "an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l. In contrast, for example, each of the amounts described in Table 1 of Li et al. are below the presently claimed range. Additionally, Li et al. do not teach or suggest precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure. In this regard, Applicants submit that Li et al. describe a temperature around 20°. See Li et al. at Table 1. Accordingly, Li et al. do not teach or suggest each and every element of the presently claimed subject matter.

In further support of the patentability of the presently claimed subject matter, Applicants respectfully submit that the temperatures taught in Li et al. favor formation of anatase instead of rutile. See the reactions (A) and (B) and the subsequent chapter on page 1389 of the Li et al. In this regard, Applicants submit that such description teaches away from the presently claimed subject matter because the conditions described by Li et al, i.e., a low temperature and/or a low concentration, are ineffective and not suitable for production of rutile titanium dioxide, on an industrial scale.

Therefore, Applicants submit that Li et al. neither anticipate, nor render the presently claimed subject matter obvious, within the meaning of either of 35 USC §§ 102(b) or 103(a). Accordingly, the Examiner is respectfully requested to withdraw this rejection.

VIII. At page 14 of the Official Action, claims 1-10, 12-17, 21-22 and 24-25 have been rejected under 35 USC § 102(b) as anticipated by, or in the alternative, under 103(a) as obvious over Murasawa (EP 0 376 216).

The Examiner asserts that Murasawa both anticipates and renders claims 1-10, 12-17, 21-22 and 24-25 obvious.

In view of the remarks set forth herein, this rejection is respectfully traversed.

The test for anticipation is whether each and every element as set forth is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131. The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

To establish a *prima facie* case of obviousness, the Examiner must satisfy three requirements. First, as the U.S. Supreme Court very recently held in *KSR International Co. v. Teleflex Inc. et al.*, Slip Opinion No. 04–1350, 550 U. S. ____ (April 30, 2007), “a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. ...it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the

claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (*KSR, supra*, slip opinion at 13-15.) Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicants respectfully submit that the cited reference does not teach or suggest every element of the present claims as required for anticipation under 35 USC § 102 (b). Additionally, it is submitted that a *prima facie* case of obviousness has not been established because nothing in the applied references teach or suggest all of the elements of the present claims, as required by *In re Wilson*.

As discussed, claim 1 is directed to a process for manufacturing a particulate titanium dioxide product, comprising: providing an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l calculated as TiO₂; adding titanium dioxide particles as crystal nuclei to the aqueous solution of titanium oxychloride; precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure to obtain a precipitated hydrated titanium dioxide product; calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C to obtain a titanium dioxide product comprised of more than 70% rutile in a crystal form.

Claims 2-10, 12-17 and 21-22, depend, either directly or indirectly, from claim 1. Claims 24 and 25 have been canceled.

In contrast to the presently claimed subject matter, Murasawa is directed to titanium dioxide aggregates suitable for an electrophotographic photosensitive material. See Murasawa at the abstract.

However, in contrast to the presently claimed subject matter, Murasawa does not teach or suggest calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C. In this regard, Murasawa describes a calcinations at a temperature in the range of from 700 to 900°C. Accordingly, Murasawa does not teach or suggest each and every element of the presently claimed subject matter.

In addition, Murasawa teaches away from the presently claimed subject matter. Specifically, according to Murasawa, calcination temperatures that are too low do not yield rutile. See Murasawa at page 3, lines 41-42. Accordingly, Murasawa teaches away from the presently claimed subject matter because a product, which is predominantly rutile, is obtained at lower temperatures. Additionally, in contrast to the present subject matter Murasawa's describes an electrophotographic photosensitive material, for which high temperatures may be suitable.

Therefore, Applicants submit that Murasawa neither anticipates, nor render the presently claimed subject matter obvious, within the meaning of either of 35 USC §§ 102(b) or 103(a). Accordingly, the Examiner is respectfully requested to withdraw this rejection.

IX. At page 20 of the Official Action, claims 14-17, 21, 22, 24 and 25 have been rejected under 35 USC § 102(b) as anticipated by, or in the alternative, under 103(a) as obvious over Bygott et al. (US Patent Application No. 2004/0092393).

The Examiner asserts that Bygott et al. both anticipates and renders claims 114-17, 21, 22, 24 and 25 obvious.

In view of the remarks set forth herein, this rejection is respectfully traversed.

The test for anticipation is whether each and every element as set forth is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); MPEP § 2131. The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP §2131. The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

To establish a *prima facie* case of obviousness, the Examiner must satisfy three requirements. First, as the U.S. Supreme Court very recently held in *KSR International Co. v. Teleflex Inc. et al.*, Slip Opinion No. 04–1350, 550 U. S. ____ (April 30, 2007), “a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. ...it can be important to identify a reason that would have prompted

a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (*KSR, supra*, slip opinion at 13-15.) Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicants respectfully submit that the cited reference does not teach or suggest every element of the present claims as required for anticipation under 35 USC § 102 (b). Additionally, it is submitted that a *prima facie* case of obviousness has not been established because nothing in the applied references teach or suggest all of the elements of the present claims, as required by *In re Wilson*.

As discussed, claim 1 is directed to a process for manufacturing a particulate titanium dioxide product, comprising: providing an aqueous solution of titanium oxychloride having a content of >90 g TiO₂/l calculated as TiO₂; adding titanium dioxide particles as crystal nuclei to the aqueous solution of titanium oxychloride; precipitating hydrated titanium dioxide particles at a temperature of 50 to 100°C, the temperature being below the boiling point of the aqueous solution of titanium oxychloride and at normal pressure to obtain a precipitated hydrated titanium dioxide product; calcining the precipitated hydrated titanium dioxide product at a temperature of 100 to 500°C to obtain a titanium dioxide product comprised of more than 70% rutile in a crystal form.

Claims 14-17, 21 and 22, depend, either directly or indirectly, from claim 1. Claims 24 and 25 have been canceled.

In contrast to the presently claimed subject matter, Bygott et al. is, generally, directed to photocatalytically active rutile titanium dioxide which is different from the presently claimed subject matter. See Bygott et al. at the abstract.

Applicants respectfully submit that Bygott et al. do not anticipate, nor render obvious, claims 14-17, 21 and 22 for at least the reason that Bygott et al. do not teach or suggest every element of present claim 1. Therefore, Bygott et al. do not teach or suggest each and every element of claims 14-17, 21 and 22, which depend from claim 1.

Therefore, Applicants submit that Bygott et al. neither anticipate, nor render the presently claimed subject matter obvious, within the meaning of either of 35 USC §§ 102(b) or 103(a). Accordingly, the Examiner is respectfully requested to withdraw this rejection.

VI. Newly Added Claims 26-44

Applicant respectfully submits that claims 26-44 are novel and non-obvious for at least the reason that claims 26-44 depend from allowable claim 1. Therefore, Applicants respectfully submit that claims 26-44 are patentable.

CONCLUSION

In view of the foregoing, Applicant submits that the application is in condition for immediate allowance. Early notice to that effect is earnestly solicited. The Examiner is invited to contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

In the event this paper is not timely filed, Applicants petition for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 14-0112.

Respectfully submitted,

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